

**What is Claimed is:**

1. An isolated nucleic acid encoding an open reading frame for a carotene-degrading oxidoreductase, comprising a sequence selected from the group consisting of:
  - (a) a sequence according to SEQ ID NO: 1;
  - (b) a sequence having 75% sequence identity with the sequence according to (a);
  - (c) a sequence capable of hybridising to the sequence of (a) and/or (b) under stringent conditions;
  - (d) a sequence that is complementary to (a), (b) and/or (c); and
  - (e) mixtures thereof.
2. A nucleic acid according to claim 1, wherein the sequence of the nucleic acid is derived from fungus or yeast.
3. A nucleic acid according to claim 2, wherein the sequence of the nucleic acid is derived from a basidiomycete.
4. The nucleic acid according to claim 3, wherein the sequence of the nucleic acid is derived from *Lepista irina*.
5. A vector comprising the sequence of a nucleic acid according to claim 1.
6. A cell transformed with a nucleic acid according to claim 1.
7. A cell transformed with the vector according to claim 5.
8. A cell culture comprising cells according to claim 7 and a suitable cell culture medium.
9. A polypeptide encoded by the nucleic acid according to SEQ ID NO: 1.
10. A polypeptide according to claim 9 having an amino acid sequence selected from the group consisting of:
  - (a) an amino acid sequence according to SEQ ID NO: 2;
  - (b) an amino acid sequence with at least 70% homology with (a);

- (c) an amino acid sequence which is immunologically cross-reactive with (a) and/or (b);  
and
  - (d) mixtures thereof.
11. A polypeptide according to claim 9, wherein said polypeptide is active in the conversion of a carotenoid substrate.
  12. The polypeptide according to claim 11, having a substrate specificity for  $\beta,\beta$ -carotene,  $\alpha$ -carotene, lycopene, capsanthin, lutein, antheraxanthin, violaxanthin, zeaxanthin, astaxanthin, canthaxanthin, luteoxanthin, neoxanthin, and the respective apo-carotenoids.
  13. An oxidoreductase active in converting carotenoid substrates isolated from yeast or fungus, having a molecular weight of about 50 kDa and an iso-electric point of about 3.75.
  14. A carotene-degrading oxidoreductase of claim 13, wherein the oxidoreductase cleaves carotenoids asymmetrically.
  15. A carotene-degrading oxidoreductase of claim 13 wherein the oxidoreductase is derived from *Lepista irina*.
  16. A detergent composition, comprising a microbial oxidoreductase capable of converting carotenoid substrates.
  17. A detergent composition comprising a microbial oxidoreductase according to claim 13.
  18. A detergent composition comprising a polypeptide according to claim 9.
  19. A detergent composition according to claim 16, further comprising a surfactant, dispersant, balance carrier and/or adjunct ingredient.
  20. A detergent composition according to claim 16, further comprising a carotene-specific esterase.
  21. The detergent composition according to claim 16, wherein the composition is substantially free of hydrogen peroxide.

22. A method for treating carotene-comprising stains, comprising contacting a material bearing the stain with a polypeptide according to claim 9.
23. A method for treating carotene-comprising stains, comprising contacting a material bearing the stain with an oxidoreductase according to claim 13.
24. A method for treating carotene-comprising stains, comprising contacting the material bearing the stain with a detergent composition according to claim 16.
25. A method for producing carotene-derived products from a carotenoid substrate, comprising the steps of:
  - (a) contacting the carotenoid precursor with a polypeptide according to claim 9; and
  - (b) incubating the mixture of carotenoid precursor and oxidoreductase to form a carotene derived product.
26. A method for producing carotene-derived products from a carotenoid substrate, comprising the steps of:
  - (a) contacting the carotenoid precursor with an oxidoreductase according to claim 13; and
  - (b) incubating the mixture of carotenoid precursor and oxidoreductase to form a carotene derived product.
27. Method according to claim 26, wherein the carotene-derived product is then isolated and/or purified.
28. A method according to claim 27, wherein the carotene-derived product is then isolated and/or purified.
29. A method according to claim 22, wherein the method is carried out in the absence of hydrogen peroxide.
30. A method according to claim 23, wherein the method is carried out in the absence of hydrogen peroxide.

31. A method according to claim 24, wherein it is carried out in the absence of hydrogen peroxide.
32. A method according to claim 25, wherein it is carried out in the absence of hydrogen peroxide.
33. A method according to claim 26, wherein it is carried out in the absence of hydrogen peroxide.